SOUTHERN UNIVERSITY AND A&M COLLEGE
Baton Rouge, Louisiana

DEPARTMENT OF MATHEMATICS

COURSE SYLLABUS
Calculus II

I. Descriptive Information

A. Course Number: 265

B. Course Title: Calculus II

C. Catalog Description: The second course of the calculus sequence of three courses. Topics include definite and indefinite integral, the fundamental theorem of calculus, integration by substitution, integration by parts, integration by partial fractions, improper integrals, applications of the definite integrals, series and the Taylor polynomial.

D. Instructor's Emphasis: The instructor will emphasize the RULE of FOUR: ***Every topic will be presented geometrically, numerically, algebraically and verbally***. In addition, the instructor will encourage students to think about the geometric and numerical meaning of calculus while they learn to think mathematically. Emphasis will be placed on helping the student to provide explanations both orally and in writing, in practical, graphical or numerical terms, of what their answers mean.

E. Course Credit : 4 hours

F. Prerequisites: Successful completion of Mathematics 264 with grade C or better, consent from the Department of Mathematics.

G. Intended Audience: This course is designed for students in the sciences, engineering, and those who are prospective teachers of mathematics.

H. Instructor:

II. Specification of Course Goals and Objectives

A. General Goals: The general goals of this course are to:

1. Provide students with a clear understanding of the ideas of calculus as a solid foundation for subsequent courses in mathematics, engineering and physical sciences,
2. Deliver to students the skills necessary to be able to apply the fundamental concepts, theorems, and methods in the calculus of integrals, in the modeling of physical problems, and
3. Provide students with the geometric, numerical, algebraic and verbal meaning of the concepts to develop their analytical and verbal skills.

B. Learning Outcomes

Completing the course students will acquire basic skills that will be measured considering the following learning outcomes:

1. Students will be able to demonstrate knowledge of anti-derivatives by knowing and applying the basic anti-derivative formulas.
2. Students will be able to demonstrate learning of the definite integral by identifying it as the limit of a Riemann sum.
3. Students will be able to demonstrate the ability to use both parts of the Fundamental Theorem of Calculus by computing definite integrals and derivatives.
4. Students will be able to demonstrate the ability to evaluate integrals by using substitution, integration by parts, partial fractions, trigonometric substitutions, and trigonometric integrals.
5. Students will be able to demonstrate competence with the applications of definite integrals by finding the area between two curves, volumes and areas of solids of revolution, arc lengths, and center of mass of solids.
6. Students will be able to demonstrate the ability to approximate integrals by using numerical integration.
7. Students will be able to demonstrate knowledge of the convergence of series and improper integrals by using the integral test, the root test, the ratio test, and the comparison tests.
8. Students will be able to demonstrate learning of Taylor series for common functions by mastering simple applications of Taylor series.

C. Statement of Course Content

Conceptually the content of the course includes the calculus of indefinite and definite integrals; the main integration techniques: substitution, integration by parts, partial fractions; application of definite integrals in physical sciences; and numerical integration techniques and the study of series are an special part of the course. Specific content is given in the Course Schedule (Heading VI).

III. Readings

Textbook: University Calculus, Joel Hass, Maurice Weir, George Thomas, Addison Wesley, 2007.

Note: Instructor may require the use of *MyMathLab* online homework management system.

Recommended calculator: A scientific graphing calculator will be a necessary tool in the course. Any calculators with capabilities comparable to those of Casio FX 2.0, TI-84, TI-85 or TI-86 are acceptable.

General Reading Sources:
Students can review classical calculus books from the library. Also students may be exposed to ***Mathematica***, a computer algebra system (CAS) that is a powerful tool to solve complex mathematics problems. They are encouraged to read the manual of this CAS before they use it.

Web Sites:
Supplementary class material and announcements may be posted on the Mathematics Department website at www.math.subr.edu, and also on blackboard website at www.blackboard.subr.edu. It is important that you visit these websites on a regularly basis.

IV. Instructional Procedures

Instruction of this course consists of formal lectures, student-teacher discussions, student-student discussions.

V. Course Requirements

A. Academic Requirements

All course requirements, e.g., tests, and assignments, are specified with due dates and criteria for scoring.

B. Administrative Requirements

Instructor's policies on class attendance, missing or late assignments and tests, and granting an incomplete are stated. All students enrolled in this course are expected to attend class regularly. Excessive absences and tardiness will not be tolerated. The student is responsible for keeping up with coursework, whether or not an absence is excused. Hard work and honest effort are expected from everyone.

VI. Course Schedule

Week	Topics
1	Antiderivatives
2	Estimating with finite sums, sigma notation, and limits of finite sums, the definite integral, and the fundamental theorem of calculus.
3	Indefinite integrals and the substitution rule.
4	Substitution and area between curves, and the logarithm defined as an integral
5	**Test 1**
6	Basic Integration Formulas, Integration by Parts.
7	Integration of Rational Functions by Partial Fractions, Trigonometric Integrals, and Trigonometric Substitutions.
8	Integral tables and Computer Algebra Systems, numerical integration and improper integrals.
9	**Test 2**
10	Volumes by slicing and rotating about an axis, and by cylindrical shells.
11	***Break***
12	Lengths of plane curves, and moments and center of mass.
13	Areas of surfaces of revolution, the Theorem of Pappus, work, fluid pressures and forces.
14	**Test 3**
15	Sequences and series, integral test, comparison test, ratio and root tests. Power series, Taylor series, convergence of power series, and applications.
16	**Review and Final Exam**

VII. Evaluation of Students

Homework/Quizzes (5)	4% each
In-Class Tests (3)	20% each
Final exam	20%

VIII. Grading

The grading scale is: **90-100:A**
80-89: B
70-79: C
60-69: D
below 60%: F